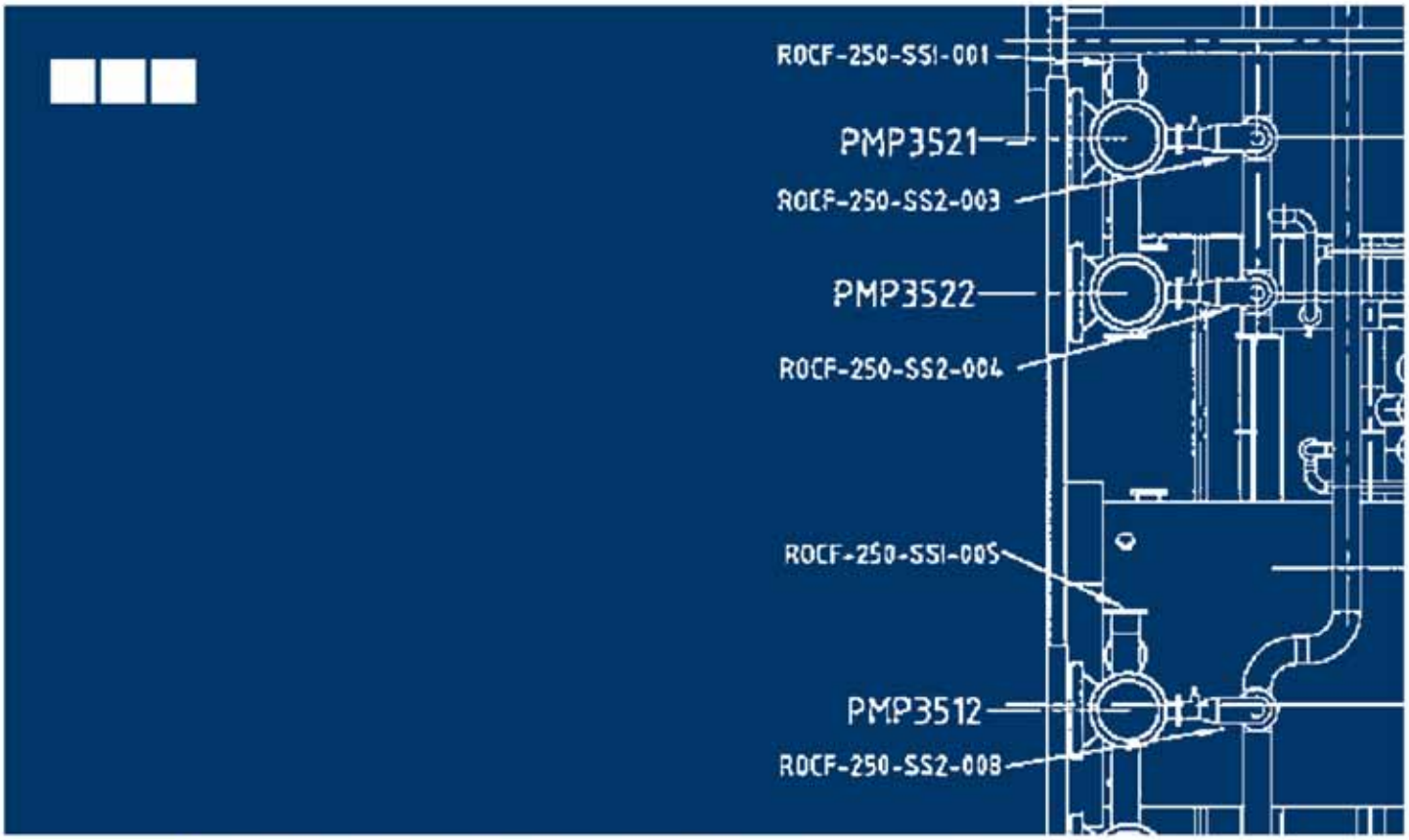

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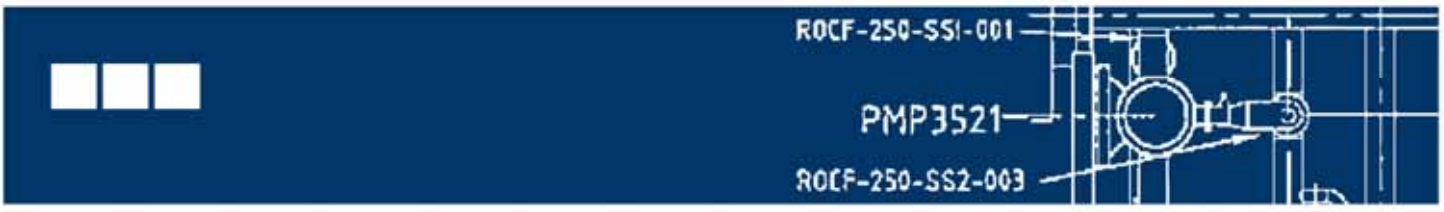
Water saving targets

For councils, plumbers, builders and developers

A guide to the Queensland Development Code part MP 4.2

Queensland the Smart State

Queensland Government
Department of Infrastructure and Planning



Water saving targets

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Introduction

Queensland's ClimateSmart 2050 strategy has been developed to help the state address climate change. Through the ClimateSmart adaptation plan, the Queensland Government is working to ensure we have a secured future water supply.

Queensland Development Code (QDC) part MP 4.2 compliments the Government's commitment to water savings by implementing mandatory water savings targets for all new class 1 buildings (houses, townhouses and terrace houses).

Water saving targets can be achieved through effective utilisation of:

- household rainwater tanks
- communal rainwater tanks
- greywater treatment plants
- dual reticulation
- stormwater reuse.

The purpose of this guide is to assist councils and the building industry in understanding the technical and regulatory requirements for the installation of rainwater tanks, communal rainwater tanks, greywater treatment plants, dual reticulation and stormwater reuse.

The guide aims to ensure the quality of our drinking water supplies and wastewater systems is maintained and our high standard of public health remains uncompromised.

A full copy of QDC part MP 4.2 is available on the Department of Infrastructure and Planning's website at www.infrastructure.qld.gov.au/bcq.

Important notes

Compliance

Compliance with water saving targets is assessed during the building approval process. Compliance measures such as dual reticulation, communal rainwater tanks or storm water reuse may be put in place during the relevant stage of the development process. This may occur at the material change of use or the reconfiguration of lot(s) stages. The building certifier may assess the building as compliant if water from one of these sources is used to meet the water saving targets in the building(s).

Alternative solutions to meet water saving targets

There is no referral agency for the QDC. Where the acceptable solutions of this standard are not adopted, the assessment manager or private certifier may assess the building for compliance with the performance criteria of this standard under the *Building Act 1975*.

Alternative provisions—increased water savings

The Building Regulation 2006 allows councils to establish higher water saving targets than those in the QDC. This can be achieved by using planning instruments or through council resolution. These additional requirements are termed 'alternative provisions' and can only be made for performance criteria 1 and 2 of QDC part MP 4.2. The criteria relate to increased water savings, the size of the rainwater tank, roof catchment area and additional connections.

Alternative provisions such as dual reticulation, communal rainwater tanks or storm water reuse may be required by council during the stages of material change of use or reconfiguration of lot(s). Building compliance and alternative provisions relating to rainwater tanks are assessed by the building certifier when the building work is proposed. If a council has not set alternative provisions, the provisions of QDC part MP 4.2 apply.

Exemptions

Councils may apply to the Minister for Infrastructure and Planning for an exemption from water savings targets where water savings options are not viable. The approved form Application for an exemption—QDC Part 4.2/4.3 and the list of councils granted an exemption is available on the Department of Infrastructure and Planning website at www.infrastructure.qld.gov.au/bcq.

Councils that have been granted an exemption under QDC part MP 4.2—Water Savings Targets, will automatically be granted an exemption for the new QDC part MP 4.3 Alternative water sources—commercial buildings. However these councils can still choose to apply the requirements of QDC MP 4.3 in their planning schemes.

Local government amalgamations

Where an existing local government area or part of a local government area has been granted an exemption, the exemption will remain for the duration of the exemption period or until such time as an application for the new local government area is received.

Associated legislation

All legislation referred to in this document is Queensland state legislation, unless otherwise stated.

This is not a comprehensive list. Individuals and organisations should also consider local and state legislation to ensure legal compliance. Legislation identified to be considered includes:

- *Building Act 1975*
  - Building Regulation 2006
- *Integrated Planning Act 1997*
- *Plumbing and Drainage Act 2002*
  - Standard Pluming and Drainage Regulation 2003
- *Water Efficiency Labelling and Standards Act 2005*
- Building Code of Australia
- Plumbing Code Australia
- Queensland Development Code
- Australian and New Zealand Design Standards
- Australian Technical Specifications

1. Household rainwater tanks

Household rainwater tanks installed to meet the requirements of QDC part MP 4.2 must be approved by a building certifier during the building approval process. All plumbing work on rainwater tanks requires approval from the local council. Specific requirements for household rainwater tanks are outlined below.

1.1 Materials and products

All components of a water supply system intended for rainwater tank applications must comply with the *Plumbing and Drainage Act 2002* (Act) and public health requirements.

It is the responsibility of designers, manufacturers, suppliers and installers to verify the suitability of products for their specific application. Materials used in the construction of a rainwater tank must be suitable for the intended end-use and clearly show Standards Marking Compliance, WaterMark compliance or Type Test Mark Compliance where appropriate.

In addition, materials and products used in the installation of a rainwater tank must comply with the requirements of the national plumbing products certification scheme. They must be of an approved type, as specified under the appropriate standard under AS/NZS 5200.000, in accordance with the Plumbing Code of Australia.

Tanks are available in a wide range of materials including: polyethylene, galvanised steel, stainless steel, or concrete. Tanks should be clearly marked with their compliance to the appropriate Australian Standard. Polyethylene tanks should be manufactured from food grade quality material.

1.2 Rainwater tank requirements

A rainwater tank must:

- have a minimum storage capacity of at least 5000 litres for detached class 1 buildings (houses) or 3000 litres for a non-detached class 1 building (townhouses, terraces)
- have a roof catchment area of at least one half of the total roof area or 100 m^2, which ever is the lesser
- supply water to at least one external tap and internally to all toilet cisterns and washing machine cold water taps
- incorporate acceptable devices to ensure a continuous supply of water to all internal fittings
- incorporate appropriate back-flow prevention devices to prevent tank water from entering the reticulated water supply network
- incorporate acceptable screens or methods of preventing mosquitoes and vermin entering the tank.

1.3 Multiple tanks

When multiple tanks are installed at the one dwelling, the tanks can either operate independently or as one unit. For tanks to operate as one unit they must be interconnected at their bases and either the elevation of their bases or the elevation of their overflows must be at the same height.

If the elevation of the overflows differs by more than 100 mm, the tanks must operate as separate units. In this case each tank must have its own trickle top-up or automatic switching device and be separately plumbed to internal fittings.

The overflow from any tank can be directed in to other tanks providing the requirements for a physical air-gap is maintained and mosquito or vermin proofing is fitted to all outlets.

A maximum storage volume of 1000 litres is to be supplied from the trickle top-up device (if fitted). This volume should be divided between the tanks based on their anticipated indoor use.

1.4 Roof catchment area

Under QDC part MP 4.2 a rainwater tank must be installed to receive rainfall from either:

- a minimum roof catchment area of at least one half of the total roof area or 100 m^2, whichever is lesser
- a greater minimum roof catchment area as specified by the local government in a local planning instrument.

For the purposes of QDC part MP 4.2, the roof catchment area of a house is the plan area of the main roof as well as the plan area of any verandas, covered patios or carports attached to the main roof area.

1.5 Continuous supply of water

Internal fixtures supplied from a rainwater tank must have a continuous supply of water and the tank must incorporate acceptable measures to prevent water from the rainwater tank entering the reticulated water supply network.

Acceptable solutions for continuous supply of water are either a trickle top-up system or an automatic switching device.

Trickle top-up

A trickle top-up system (figure 1) provides an approved plumbing connection between the mains water supply and the rainwater tank. This system is designed in accordance with the Act. The system incorporates a physical air gap that acts as a backflow prevention mechanism and prevents cross connection between rainwater and the mains water supply. The air gap should be designed according to AS/NZS 3500.1.

The minimum flow-rate supplied by a trickle top-up system is three litres per minute and the unit should be installed in an easily accessible location. The device should be limited to servicing a maximum storage volume of 1000 litres of the tank's total capacity, the remainder of the tank being filled with rainwater diverted from the roof area of the building.

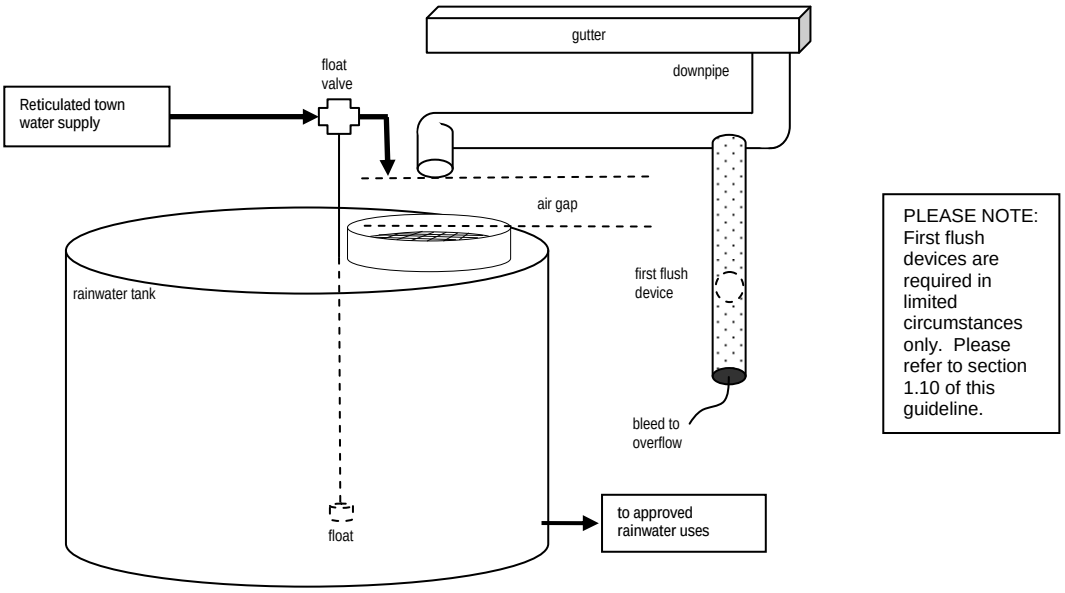


Figure 1. Trickle top-up system

Automatic switching device

An automatic switching device (figure 2) controls the water supply to the plumbing outlets by automatically switching from tank water to mains water when the water level in the rainwater tank is insufficient to meet household demand. It should switch to the mains water supply at a level of 1000 litres. The switching device must incorporate a built-in backflow prevention device to protect the quality of the mains water supply. When an automatic switching device is installed, a dual check valve must also be fitted at the property boundary. This is necessary to prevent backflow in accordance with the Act.

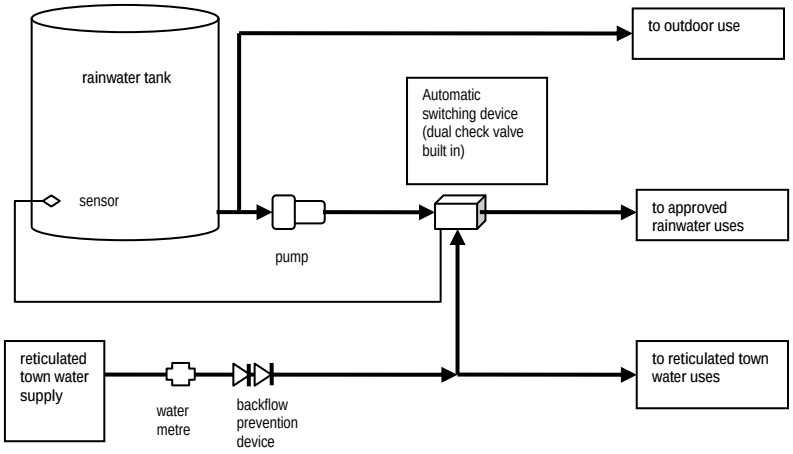


Figure 2. Automatic switching device plumbing

1.6 Outdoor water restrictions

When an automatic switching device is fitted to the household water-supply system and the external or garden take off is located on the tank or between the tank and the automatic switching device, the use of tank water for outdoor purposes is exempt from a council's outdoor restrictions.

In all other cases (including with trickle top-up systems) a council's outdoor water restrictions apply (see Figure 3)

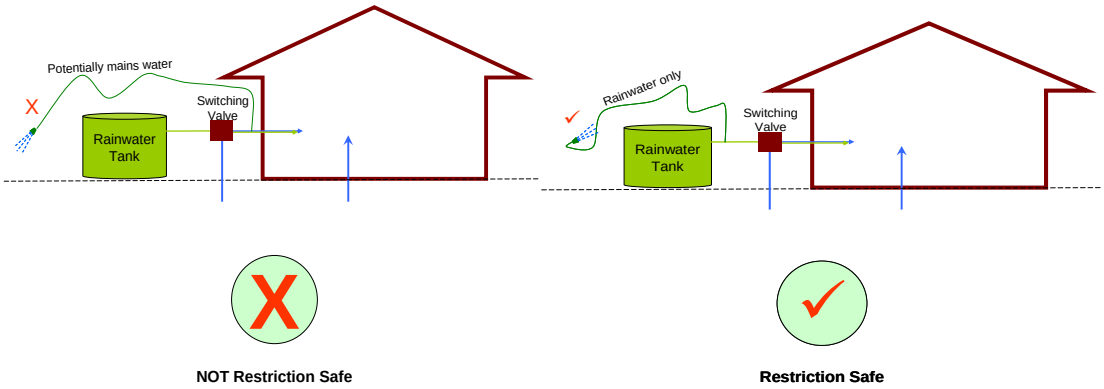


Figure 3. Outdoor water restriction

1.7 Overflow from rainwater tank

The placement of a rainwater tank and its overflows must be designed to ensure stormwater does not:

- pond under building floors
- flood around foundations and footings of buildings
- cause nuisance to neighbours.

The following measures must be adopted to ensure building integrity and health and safety measures are not compromised.

- To avoid rainwater tank overflow blockage, a physical air break on the outlet of the tank overflow and before the stormwater drainage system should be provided. This will also act as a visual inspection point to detect trickle top-up system failure.
- The tank overflow must be connected to the lawful point of discharge for the property, for example the kerb and channel, or the council inter-allotment stormwater pit. The capacity of the existing stormwater system to manage an increase in flow should be checked with council before a connection is made.

1.8 Dry and wet systems

There are two types of systems used to direct the water from the roof catchment area to a rainwater tank. These are dry systems and wet systems.

A dry system comprises free-draining pipes that dry out and do not hold water after each rainfall event. A wet system comprises pipes that are not free-draining and water remains in the pipe work between storm events.

Wet systems can assist in maximising the usable roof catchment area while maintaining the aesthetic value of a house. If a wet system is used, all down pipes must be fitted with mosquito proof screens to prevent mosquitoes entering the pipes and ultimately the system. A means of draining a wet system should be incorporated into the design to avoid stagnation in the event of prolonged dry periods.

Dry systems are generally recommended as any risk of mosquito breeding and water stagnation in the pipes is eliminated.

1.9 Leaf diversion

A screened downpipe rain head must be installed on each downpipe connected to the tank. The screen mesh must have openings no smaller than 4 mm and no larger than 6 mm and shall be designed to prevent leaves from entering the downpipe.

1.10 First flush device

Roofed areas can build up with contaminants such as bird droppings, dust and organic matter. There is no mandatory requirement for a first flush device to be installed where the minimum connections (toilet cisterns, washing machine cold water taps and an external use) are supplied with water from a rainwater tank. To assist in maintaining rainwater quality where the rainwater tank is supplied to any extra connections (including showers, wash basins, kitchen or hot water services) a minimum 20 litres of the first flush from the total roof catchment area, must be diverted or discarded before entering the rainwater tank. Individual site analysis is required in heavy pollutant areas to determine if larger volumes of first flush rainwater are to be diverted. Rainwater from the first flush system must be discharged to the property's overflow drainage system. Councils may choose to mandate first flush devices through a planning instrument.

1.11 Pumps

Pumps must be installed or positioned to ensure noise levels do not create nuisance for neighbouring properties. The pumping system should be designed to ensure maximum static pressure at any outlet or fixture does not exceed 500 kPa (kilopascals) and minimum pressure at the most disadvantaged outlet or fixture is not less than 50 kPa at the minimum flow rate required (refer to AS/NZS 3500.1 2003).

1.12 Signage

Green-coloured identification tape marked 'CAUTION RAINWATER LINE BURIED BELOW' (figure 4) should be used to identify:

- underground stormwater pipes to the tank
- underground water supply pipes from the tank.

Identification tape is to be laid above the pipes and within the trench. Identification markings should comply with AS 1345.

Figure 4. Rainwater pipe signage

Pipe work less than 40 mm in diameter shall have a continuous green pipe marker band around the circumference of the pipe with the word “RAINWATER” (figure 5) in not less than 4 mm upper case letters. The tape should be placed longitudinally along the pipe so that the marking is visible from all viewing directions.

Figure 5. Rainwater pipe marker

All outdoor hose taps that are supplied with rainwater are to be identified with a metallic safety sign (100 mm long, 75 mm wide) labelled ‘RAINWATER’ (figure 6). The sign should be securely fixed above the rainwater hose tap outlet. The word and symbol are to be in black writing on a yellow background. The hose tap should be fitted with a hose connection vacuum breaker valve or backstop valve. Signs must comply with AS 1319.

Figure 6. Rainwater signage

The washing machine cold water outlet should be identified as rainwater with one of the following: a tap button, a green coloured indicator with the letters ‘RW’ or a sign similar to that specified for outdoor outlets.

Where other internal rainwater connections are approved by councils, outlets should be identified in accordance with council requirements.

1.13 Maintenance

Tanks fitted with leaf guards will generally keep out vegetation, insects and small animals, although some maintenance is required to ensure effective on-going operation, water quality and health protection.

Comprehensive management information for rainwater tank systems is contained in the enHealth Council monograph ‘Guidance on the Use of Rainwater Tanks’. It includes information on potential hazards, preventative measures, and monitoring and maintenance. A general maintenance schedule derived from the enHealth monograph appears in appendix 1.

The Queensland Health Managing the Use of Rainwater Tanks policy outlines requirements and responsibilities in relation to human health with the use of rainwater tanks.

Vermin and mosquito control requirements

Rainwater harvesting systems should be constructed and properly maintained to prevent entry and breeding of mosquitoes and other vermin.

Requirements include the installation of mosquito-proof screens on all openings made of brass, copper, aluminium or stainless steel. The netting of the screen should be 1 mm or finer. Vermin traps are also required to prevent entry of vermin. Materials used for mosquito and vermin control should be made from a material compatible with the material used on the opening to prevent tank deterioration.

Further information on mosquito and vermin control can be found in the Queensland Health Managing the Use of Rainwater Tanks policy.

Rainwater tank maintenance access requirements

Rainwater tank openings should have suitably constructed barriers that prevent entry of children, animals, insects and rubbish. All tanks are to be constructed in a manner that prevents entry of surface water, stormwater and groundwater.

2. Communal rainwater tanks

Communal rainwater systems are approved on a case by case basis by councils at the material change of use or reconfiguration of lot(s) stages of the development process. The body corporate has responsibility on behalf of the owners for the communal tank(s), pipe work and intended connected use of the tank. It is also important to consider the roles and responsibilities of each property owner regarding:

- water quality
- system maintenance
- ownership of the system.

The size of the tank should be relative to the combined capacities required if each connected house had an individual rainwater tank.

2.1 Continuous supply—communal rainwater tanks

Where communal rainwater tanks are connected to internal household uses, provisions must be made to ensure continuous supply to those uses. Where a trickle top-up system is used, its volume should also be equal to the combined trickle top-up volumes were each house to have its own tank.

3. Dual reticulation

Dual reticulation is the simultaneous supply of water from two separate sources, requiring two sets of pipes. One pipe provides water for drinking, cooking and bathing purposes the second provides recycled water for other non-drinking purposes.

Effluent reuse schemes and community rainwater tanks are examples of dual reticulation systems that can be established to offset use of drinking water within designated reticulated water supply areas. Household rainwater tanks are not classed as dual reticulation.

In Queensland, the quality of recycled water is the responsibility of the water service provider and is defined by their quality standard from highest (A+) to lowest (D).

A+ quality water is required for toilet flushing and residential outdoor use in dual reticulated areas under the Queensland Water Recycling Guidelines.

Dual reticulation systems are approved on a case by case basis by councils using a risk management approach at the material change of use or reconfiguration of lot(s) stages of the development process.

The Department of Natural Resources and Water's Planning guidelines for water supply and sewerage outline the Queensland Government's adoption of Water Services Association of Australia codes as suitable standards for collection and reticulation in sewerage and water supply schemes, including recycled water. The adopted codes include:

- WSA 02—2002 Sewerage Code of Australia
- WSA 03—2002 Water Supply Code of Australia
- WSA 04—2001 Sewage Pumping Station Code of Australia

The Water Services Association of Australia's Dual water supply systems covers the design and construction of dual supply systems for servicing new developments that provide both drinking water and non-drinking water via reticulation. The supplement contains advice relating to:

- differentiation of drinking water and non-drinking water pipe systems via colour coding and other markings
- design considerations for dual supply systems, including system configuration, sizing of mains, pressure, main depths, fittings and flushing points
- construction and installation of property services
- standard drawings for prevention of cross-connections between drinking and non-drinking water supply systems.

While the codes are not mandated, they are suggested as suitable for installation and maintenance of dual pipe systems in Queensland under the Queensland Water Recycling Guidelines 2005. Local councils should be consulted before any work commences on dual reticulation systems to check any additional council requirements.

4. Stormwater reuse

Stormwater may be used for purposes such as irrigation and toilet flushing. As with recycled water the supplier must ensure that the water is treated to an appropriate level for its intended end use.

Stormwater reuse systems are approved on a case by case basis by councils using a risk management approach at the material change of use or reconfiguration of lot(s) stages of the development process.

An appropriate risk management approach is outlined in the Queensland Water Recycling Guidelines. The risk management approach contained in these guidelines is based on a number of principles including:

- National Guidelines for Water Recycling
- Australia and New Zealand risk management standard AS/NZS 4360:1999
- Hazard Analysis and Critical Control Point system.

The Australian Runoff Quality guidelines have been developed by the Engineers Australia National Committee on Water Engineering. The guidelines contain information on stormwater pollution, treatment and reuse.

Further information on stormwater harvesting and reuse is available from the New South Wales Environmental Protection Agency.

Further information on existing Australian practices in stormwater reuse, innovative design solutions covering the core functions of collection, treatment, storage, flood protection, and water distribution amongst the end uses and best practice recommendations is available from Monash University.

5. Greywater treatment plant

A greywater treatment plant treats greywater generated on premises from hand basins, showers and laundries, and is installed to meet the requirements of the QPW code and QDC part MP 4.2.

Under the QPW code a greywater treatment plant must treat water to the quality required for its end use as specified in table T1. Greywater is treated by running the water through various filters then disinfecting the water through the use of chlorine, ultra-violet light or ozone disinfection. All greywater plumbing work requires plumbing and drainage approval from the local council.

A greywater treatment plant must:

- be installed to receive greywater from all bathroom sanitary outlets in the building
- have a minimum processing capacity to treat total greywater input vessel volume in 24 hours
- have a storage capacity not exceeding 2000 litres
- be connected to supply treated water to:
  - all toilet cisterns
  - washing machine cold water taps
  - an external tap
  - other fixtures as specified by the local government in a local planning instrument
- supply the treated water, separate to the reticulated town water supply, to:
  - toilet cisterns using a dual-float system
  - washing machines using a separate cold water tap connected directly to the greywater treatment plant
- have an automatic switching device providing supplementary water from the reticulated town water supply system
- dispose of untreated greywater to the sewer
- be an approved greywater treatment plant.

Lists of approved greywater treatment plants are available on the Department of Infrastructure and Planning website at www.infrastructure.qld.gov.au/bcq.

5.1 Maintenance

Greywater treatment plants must be maintained in accordance with the service manual of the manufacturer. Local councils may set requirements for the maintenance periods of greywater treatment plants.

Appendix 1. Maintenance of rainwater tanks and fittings

Maintenance of rainwater tank and fittings

Maintenance action	Regularity
Check and clean mosquito net on tank overflow outlet	October–March: every month April–September: every three months
Check and clean first flush device	three months
Check roof and gutters for the presence of accumulated debris including leaf and other plant material	three months
Clear accumulated plant material	three months
Prune overhanging tree branches and foliage	three months
Check water quality—must be clear with no smell	six months
Check for evidence of animal, bird or insect access including mosquito larvae; if present, identify and close access points	six months
Check tank for defects and repair	six months
Check for evidence of algal growth; If present, find and close points of light entry	six months
Ensure taps have the correct signage installed	six months
Clean tank to remove accumulated sediment or sludge	two years

More detailed information regarding rainwater tank system management, such as potential hazards, preventative measures, monitoring and maintenance, is contained in the enHealth Council document Guidance on the Use of Rainwater Tanks.

Appendix 2. Useful references

Queensland Development Code MP 4.2

Department of Infrastructure and Planning water saving targets information

enHealth Council monograph Guidance on the Use of Rainwater Tanks

Queensland Health Managing the Use of Rainwater Tanks policy

Department of Natural Resources and Water's Water Planning Guidelines for Water Supply and Sewerage

Water Services Association of Australia codes
- WSA 02—2002 Sewerage Code of Australia
- WSA 03—2002 Water Supply Code of Australia
- WSA 04—2001 Sewage Pumping Station Code of Australia

Water Services Association of Australia Dual Water Supply Systems

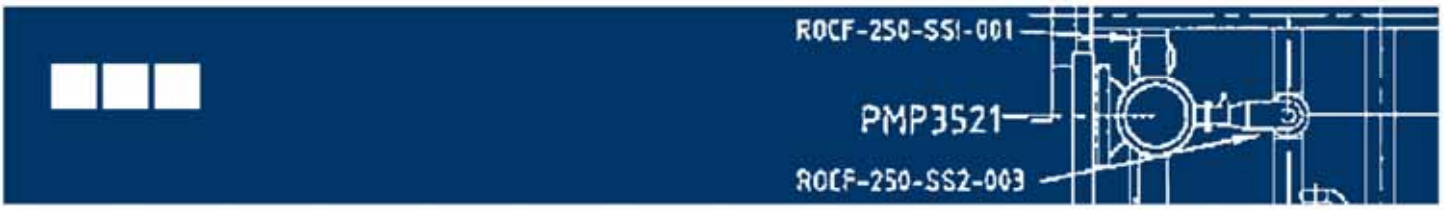
Queensland Environmental Protection Agency Queensland Water Recycling Guidelines

Australian Runoff Quality Guidelines

Further stormwater reuse information
New South Wales Environmental Protection Agency stormwater page

Monash University stormwater page

Australian Rainwater Industry Development Group Rainwater Tank Design and Installation Handbook



Department of **Infrastructure and Planning**
Building Codes Queensland
PO Box 15031 City East Qld 4002 Australia
tel +61 7 3239 6369
fax +61 7 3237 3247
buildingcodes@dlgpsr.qld.gov.au

www.infrastructure.qld.gov.au

December 2007